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ABSTRACT

The value of developmental baseline information is examined from an educational point of view. Data from studies on preschool children and primary and secondary school students that were carried out in Singapore are focal to the discussion. Sections of the paper concern: (1) assumptions about the value of baseline data on human development and children's learning; (2) curriculum needs of the preschool and primary school in Singapore; (3) baseline data on preschool children's cognitive capacities; (4) baseline data on primary school children's cognitive abilities; and (5) baseline data on moral and social behavior. Discussion reveals that in Singapore the amount of baseline data available for curriculum planning is growing. Preschoolers' performance on many mathematical tasks shows success, even beyond the expectations of the first and second year of the primary school mathematics curriculum. Language performance, especially in the areas of verbal fluency and pronunciation, fell short of expectations, as did performance on cognitive developmental tasks. The inclusion of new items on social cooperation and culturally relevant values in the assessment of social and moral behavior may facilitate the development of a Moral Education Program. In sum, a sound basis for curriculum development is being established in Singapore. (RH)

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Putting baseline data on Human Development into context for the Purpose of Schooling : Ideals and Realities

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Putting baseline data on Human Development into context for the purpose of Schooling: ideals and realities.

(A) Introduction

In all developing countries, the education of the younger members of the population has been and still remains a top priority. Most developing countries have either been influenced directly or indirectly by ideas coming from their more advanced former colonial regimes or from countries with which the developing country had strong economic and socio-political links. In the majority of cases, these influences meant that educational systems were modelled on these countries.

In the early years after independence, the continued reliance by many developing countries on the former metropolitan power for social,cultural and economic aid, meant that the education system including the school curriculum reflected metropolitan practices and ideas. The drive in many developing countries was to increase the capacity and source of trained manpower and therefore quantitative considerations "loomed large" in order that more trained teachers were available and more children could be educated; and educated quickly. The pre-occupation with educational quantity meant that the qualitative aspects of education were not only neglected, but for the most part not understood by those responsible for the school curriculum and by those who trained the teachers who implement the curriculum. However, in the last decade much more attention has been paid on re-examining the aims and objectives of education and especially schooling which is part of the total educational process. This has lead to a serious debate about the quality of education not only in developing countries but also in countries like Britain and

America.

The research discussed in the present paper must be seen against the back-drop of the current debate on achieving educational quality. As far as the needs of the school curriculum are concerned, the learner and the learner's environment are essential elements of any curriculum planning process. In the quest for improving the quality of education and schooling, knowing how children learn and develop within their environment is a key factor in the process of curriculum development. In this paper reference to the child's environment means home conditions which include social, cultural and religious influences. When a school curriculum is being planned to improve the quality of schooling, several factors need to be borne in mind by the planners :

(a) The provision of well trained and experienced teachers.

(b) Curriculum planners who are trained in educational research.

(c) Provision of appropriate teaching and learning materials for classroom use.

(d) Availability and access to baseline information on the ways children learn and think and develop these capacities.

The principal concern of this paper is with factor (d) namely the availability of baseline information on various aspects of children's learning and development.

(B) Some assumptions about the value of Baseline Data on Human Development and children's learning

For most developing countries, acquiring baseline data means acquiring first time data, and while replication is both necessary and desirable, it is often impossible to achieve in view of the difficulties of getting the skilled personnel to collect and interpret the findings. Therefore, baseline data under these conditions needs to be researched carefully and rigorously wherever possible. There are several assumptions on which baseline data on human development should be acquired by educationalists.

(1) It should provide a developmental profile of children's cognitive, physical , social and moral abilities in the context of their own cultural environment.

(2) With such a profile, decisions can be made about the type of curriculum that is most suitable for children of differing abilities.

(3) As access to schooling in most countries is based on chronological age, then age-norm baseline information on learning and development would also be useful for curriculum planning.

(4) It should provide valuable information for teachers to give more meaningful comments of a diagnostic and prescriptive nature relating to pupil performance.

(5) Baseline developmental information could also influence the way teachers teach as well as giving teachers a foundation until other behaviour such as learning, motivation, thinking and perception relate.

and finally:

(6) That there are the personnel available to collect, analyse and interpret the baseline information in the context of educational needs.

It takes time for all the assumptions to be realised, but serious attempts need to be made and are being made in many countries to meet the challenge which furnishing baseline data on children's abilities presents. It needs to be pointed out also, that both cultural as well as methodological factors play an important part in relating the use of baseline data appropriate to the needs of a curriculum.

Therefore, the thesis of the present paper is; that developmental data which is collected to provide base line normative information may be a necessary but not sufficient condition for improving the school curriculum. Methodological, cultural and educational factors are also important in the ultimate use to which baseline information is put in curriculum development.

(C) Scope of the paper

Data from studies* carried out on Singapore schoolchildren will form the main focus of the discussion in the paper. The data originates from studies of children attending pre-schools, primary and secondary schools in the Republic. Cognitive,social and moral developmental tasks given to the schoolchildren provide the source of the data. The data discussed below is first time base line data collected so that the existing curriculum could be re-examined in pursuit of improved learning and teaching processes. Before discussing the data, some background of schooling in Singapore and expectations of the school curriculum may be useful.

* The author worked as full time Educational Psychologist at the Institute of Education Singapore from 1981-86 and wishes to acknowledge the very valuable assistance given to him by the Director and staff, without which this paper would not be possible.

(D) Children's Abilities : Schooling and the Needs of the School Curriculum

The curriculum needs of the pre-school and primary school in Singapore as far as cognitive abilities are concerned are seen in terms of mastering sets of competencies relating to language, mathematics and science. English has equal status with local languages such as Mandarin, Malay and Tamil, and now all instruction in schools is conducted through the medium of English.
Making English the medium of instruction, means it is likely to have an influence on children's learning and development which may not be the case as in nearby Malaysia and Thailand. In these countries, English is truly a second language, Bahasa Malaysia and Thai respectively being the first and only language of instruction. The language context is important in chartering the development of cognitive abilities both in school and for carrying out research. Tasks which may be administered in English, (which is only the preferred language of about 10% of the pre-school and primary school population) are translated into the preferred language of the child. Apart from language and its possible influence on the process of intellectual development, another factor which needs to be considered, is the degree to which the cognitive outcomes of schooling are taken so seriously by the Singapore authorities and the society at large. The blunt fact is, that survival for Singapore in a highly competitive and aggressive environment means every advantage has to be taken of developing children's intellectual potential to the full.

In order to develop this potential, a first step is the acquisition of base line information on children's learning

capacities and developmental patterns, so that some type of match can be anticipated between what children are capable of at certain ages and the planning of an effective school curriculum. A perfect match between curriculum needs and children's ability to respond to these needs is an ideal. The reality is that achieving a match has been shown to be elusive if not impossible to attain, Shayer (1980), Driver(1980), Thomas (1981). Furthermore, it could be argued that seeking out too close a match may not be desirable anyway, for it could have limitations on teaching and learning processes, by stifling key features such as adaptability and imagination of both teachers and learners alike.

However, baseline data on children's cognitive abilities provide a series of benchmarks from which more relevant and educational valid curricula may be developed. In connection with the above, studies concerned with establishing social and cognitive developmental baseline data on Singapore Pre-school, Primary schoolchildren will be examined, as well as a discussion of data on secondary students' appreciation of moral values. Curriculum needs of the Singapore school system is not only confined to knowing about children's cognitive development, much emphasis is put on social and moral aspects of the school curriculum, Ong Report (1979). Therefore, baseline information about how children's moral and social capacities are developed, are equally crucial in meeting the demands of a new Moral Education Programme, designed at present for Secondary school age children but likely to be extended to Primary schools later on.

(E) Base line data on Pre-school children's Cognitive Capacities.

In a comprehensive study of Singapore Pre-school children's social and cognitive development*, Ko (1985), Ko, Thomas (1986) employed a cohort-sequential design, as a means of collecting base line information on the social and cognitive development of children aged 3 - 7 years, all of whom attended a variety of pre-school institutions in the Republic. The sample of 574 children reflected gender and ethnic proportions of the pre-school population. The parental socio-economic status was mainly drawn from the middle to high income groups although lower income group were also represented. All the pre-school sample were interviewed in their preferred language (ie Mandarin or Malay or Tamil or English) and asked to perform 30 tasks. The contact time was spread over several days to avoid subject and experimenter fatigue. Each contact session was about 15 minutes. The tasks had been translated from English into the three main languages of Singapore (i.e. Malay, Mandarin and Tamil) and back translated so that competent measures were available. The tasks included language, mathematics, developmental and social measures.

The cognitive developmental theory of Piaget was used as a framework for the developmental tasks. Conservation, Causal thinking, Classification, Seriation, Spatial Reasoning and time concepts were among these tasks. Tasks on Language and Mathematics were not part of the developmental framework but based on expected subject competency at a particular grade level. All tasks had been developed or modified for use in the local pre-schools with safeguard for material familiarity and conceptual equivalence.

*The author wishes to acknowledge the generous support given by the Bernard van Leer Foundation of the Netherlands which made this research possible.

A Factor Analysis using a varimax rotation solution showed high loadings on mathematical tasks which tested recognition, counting, manipulation of numbers in addition and subtraction constituted Factor I. Factor II revealed high loadings on language tasks including word knowledge, verbal fluency and audio-discrimination suggesting fairly strong linguistic abilities.

Factor III suggested that causal-spatial abilities were part of these children's cognitive profile and was so named.

The appreciation of conservational notions and the ability to sort out objects loaded on Factors IV and V respectively, indicating a weak presence of these abilities in the children's cognitive profiles. The strong mathematical flavour to the pre-schoolers' cognitive profile is particularly interesting when the results of specific tasks are examined. For instance, as shown in Table 1 in tasks requiring children to match, recognise and relate numbers, over 80% of cohort (6 - 7 years, N=89; the oldest pre-school cohort) were able to perform the tasks.

Table 1 Percentage Numbers of Children from 5 Cohorts Showing Their Successful Achievement on Thirteen Mathematics Tasks

No	Task	AGE COHORTS					
		N=84	N=93	N=96	N=87	N=113	N=89
		Age 3.6 - 3.11	Age 4.0 - 4.5	Age 4.6 - 4.11	Age 5.0 - 5.5	Age 5.6 - 6.0	Age 6 - 7
1	Number Concept	64	66	66	67	71	79
2	Verbal Counting 1-10	87	86	94	97	98	99
3	Verbal Counting 11-20	23	37	54	56	82	91
4	Rational Counting	20	36	54	53	80	90
5	Number Conservation	26	26	32	36	46	52
6	Matching of Numerals	14	16	42	56	72	83
7	Number Relations	37	45	71	78	89	88

	Task	AGE COHORTS					
		N=34	N=33	N=35	N=39	N=113	N=39
		Age 3.6 - 3.11	Age 4.0 - 4.5	Age 4.6 - 4.11	Age 5.0 - 5.5	Age 5.6 - 6.0	Age 6 - 7
8	Concept Grouping						
	1 Attribute	43	33	26	13	23	13
	2 Attributes	51	63	67	80	72	82
	3 Attributes	0	1	3	5	4	3
9	Number Recognition	13	17	43	47	77	89
10	Addition-Pictorial	29	33	55	53	82	91
11	Addition-Symbolic	4	3	15	19	52	69
12	Subtraction-Pictorial	35	36	70	70	87	94
13	Subtraction-Symbolic	4	4	9	13	33	35

Table 1a Percentage numbers of children attaining positive status on Mathematical tasks over three test occasions, for two age cohorts together with F values(repeated measures) and performance pattern.

	Tasks	Cohort 3y6 - 3y11 (n=35)					Cohort 5y0 - 5y6(n= 50)				
		PATTERN OF PERFORMANCE OVER 3 TEST OCCASIONS			PATTERN DESCRIPTION	F VALUE	SIGNIFICANCE LEVEL	PATTERN OF PERFORMANCE OVER 3 TEST OCCASIONS			PATTERN DESCRIPTION	F VALUE	SIGNIFICANCE LEVEL
		1st	2nd	3rd				1st	2nd	3rd			
1	[illegible]	17	79	66	Erratic (Progression)	2.36		11	77	74	Erratic (Progression)	6.87	p >.01
2	Rational Counting	6	33	88	Progression	33.33	p >.0001	11	91	97	Progression	8.37	p >.01
3	Number Recognition	46	71	91	Progression	18.29	p >.0001	87	93	99	Progression	4.39	p >.01
4	Number Matching 1	58	78	92	Progression	16.69	p >.0001	86	98	98	Progression	13.02	p >.0001
5	Number Matching 2	48	73	90	Progression	20.12	p >.0001	84	96	98	Progression	10.48	p >.0001
6	Number Relations: 2 + 4	14	67	78	Progression	2.75		11	93	95	Progression	0.95	
7	Number Relations: 3 + 5	3	61	78	Progression	6.52	p >.001	13	88	95	Progression	1.67	
8	Number Conservation	23	24	46	Progression	2.23		43	48	51	Progression	1.38	
9	Addition - Pictorial	52	78	91	Progression	18.26	p >.0001	74	93	97	Progression	13.51	p >.0001
10	Addition - Symbolic	5	21	40	Progression	26.53	p >.0001	18	54	65	Progression	27.40	p >.0001
11	Subtraction - Pictorial	57	80	89	Progression	14.84	p >.0001	86	95	97	Progression	6.06	p >.003
12	Subtraction - Symbolic	5	15	32	Progression	24.04	p >.0001	17	24	53	Progression	23.08	p >.0001

Table 2 Percentage Numbers of Children from 6 Cohorts Showing Their Successful Achievement on Twelve Language Tasks

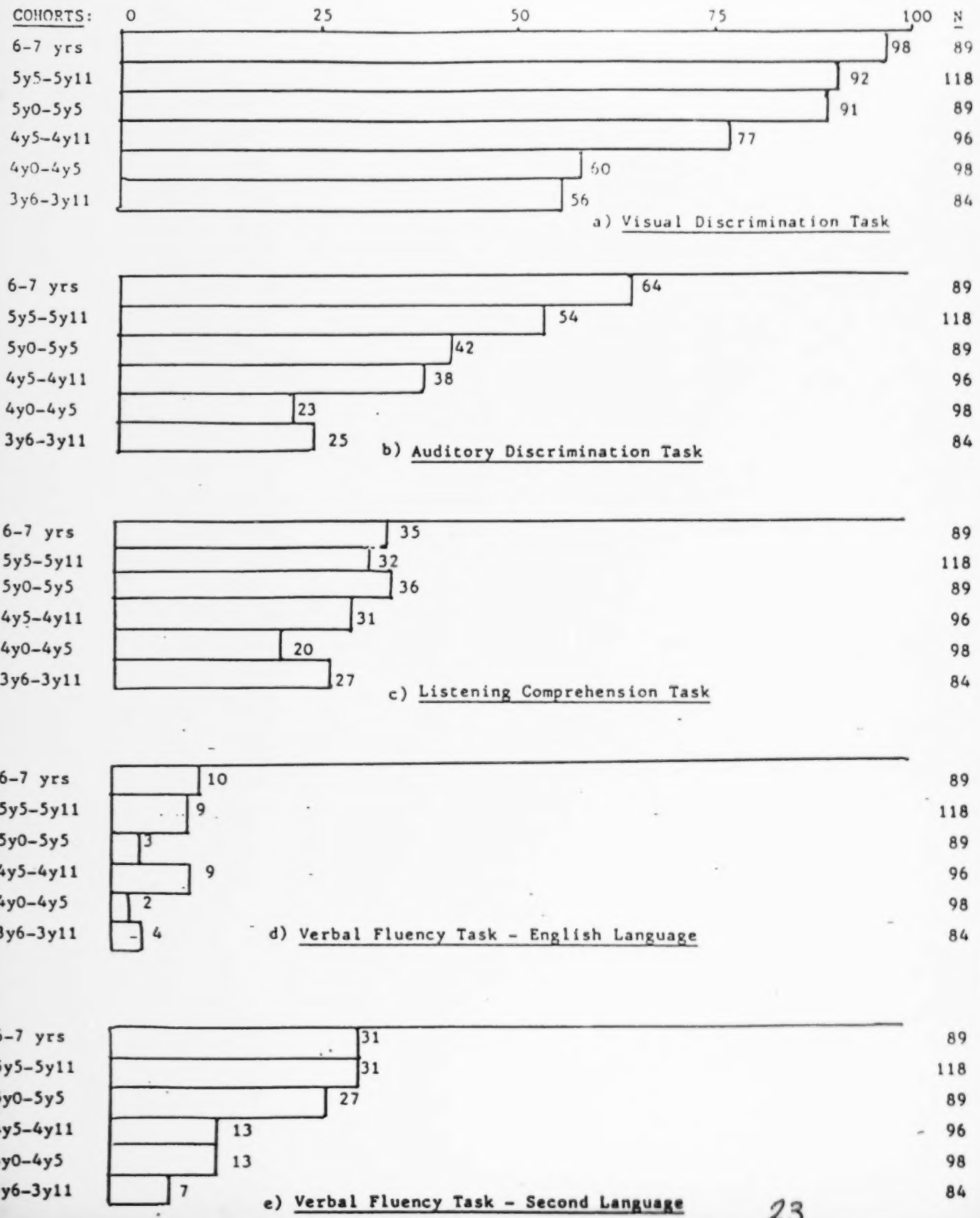
		AGE COHORTS					
		N=84	N=93	N=95	N=89	N=115	N=39
	Task	Age 3.6 - 3.11	Age 4.0 - 4.5	Age 4.6 - 4.11	Age 5.0 - 5.5	Age 5.6 - 5.9	Age 6 - 7
1	Visual Discrimination	56	61	77	91	92	96
2	Auditory Discrimination 1	25	23	33	42	54	54
3	Auditory Discrimination 2	27	20	31	36	32	35
4	Symbol Material	54	71	89	85	91	96
5	Book Orientation	52	61	59	54	81	87
6	Listening Comprehension	29	24	29	30	40	36
7	Recognition of Upper Case-Small Letters	11	24	51	57	71	75

No.	Task	AGE COHORTS					
		N=34 Age 3.6 - 3.11	N=43 Age 4.0 - 4.5	N=32 Age 4.6 - 4.11	N=97 Age 5.0 - 5.5	N=113 Age 5.6 - 5.9	N=89 Age 5 - 7
8	Recognition of Upper Case-Capital Letters	31	38	54	63	75	78
9	Word Knowledge English Language	48	44	51	52	56	51
10	Verbal Fluency English Language	4	2	9	3	9	10
11	Word Knowledge Second Language	18	31	48	46	71	71
12	Verbal Fluency Second Language	7	13	13	27	31	31

Table 2a Percentage numbers of children attaining positive status on English Language Tasks over three test occasions for two cohorts, together with F values(repeated measures) and performance patterns.

	Tasks	Cohort 3y6-3y11 (n= 35)				Cohort 5y 0 - 5y 6(n = 50)			
		PATTERN OF PERFORMANCE OVER 3 TEST OCCASIONS 1st	2nd	3rd	PATTERN DESCRIPTION	F VALUE	SIGNIFICANCE LEVEL	PATTERN OF PERFORMANCE OVER 3 TEST OCCASIONS 1st	2nd	3rd	PATTERN DESCRIPTION	F VALUE	SIGNIFICANCE LEVEL
1	Visual Discrimination	64	80	86	Progression	5.190	p >.01	88	95	98	Progression	7.44	p >.0001
2	Auditory Discrimination 1 Single word endings and beginnings	55	65	69	Progression	2.290		68	72	76	Progression	4.67	p >.01
3	Auditory Discrimination 2 Sounds in sentence form	40	52	50	Slightly Erratic	3.110		41	46	54	Progression	2.45	
4	Book Orientation	76	81	85	Progression	1.030		83	92	95	Progression	3.54	
5	Listening Comprehension	47	61	66	Progression	2.330		51	65	77	Progression	4.47	
6	Letters - lower case	34	68	90	Progression	28.755	p >.0001	63	84	88	Progression	4.60	p >.01
7	Letters - upper case	48	82	96	Progression	27.910	p >.0001	74	88	91	Progression	4.10	p >.01
8	Word Knowledge - English	68	87	84	Slightly Erratic			69	80	84	Progression		
9	Word Knowledge - Second Language	48	53	60	Progression			70	77	86	Progression		
10	Verbal Fluency - English	6	9	20	Progression	4.09	p >.01	6	9	15	Progression	1.37	
11	Verbal Fluency - Second Language	6	12	22	Progression	1.36		21	11	31	Erratic (progression)	2.91	

FIGURE 1: PERCENTAGE NUMBERS OF CHILDREN SHOWING DIFFERENT LEVELS OF SUCCESS ON SELECTED LANGUAGE TASKS



The results for number conservation (52%); addition (80%) and subtraction (63%) tasks show with even these more difficult tasks over half the final cohort can successfully perform them.

The above results suggest that those responsible for primary school curriculum planning in mathematics might, consider introducing number conservation type exercises and addition and subtraction earlier than at present. Symbolic addition is done in the second year of primary school and subtraction in the third year. From the factor matrix, certain language abilities figured strongly in the children's cognitive profile, especially word knowledge and symbolic recognition of letters and words (See Table 2 and Figure 1).

Further examination of the results of the verbal fluency tasks, gave base line information which indicated a poor level of fluency in both English and the local languages. This suggests that curriculum planners might consider including in teacher and pupils guides, opportunities at the primary level for pupils to speak with their teachers and their peers much more often. This would apply for children speaking whatever languages they prefer to use. The above results indicate that in general, the cognitive profile of these children is dominated by specific mathematical abilities to a lesser extent linguistic and to much lesser extent cognitive developmental abilities such as appreciation of conservational and causal notions, and the ability to sort out objects (See table 3 and Figure 2).

Table 3 Percentage Numbers of Children from 6 Cohorts Showing Their Successful Performance on Eleven Cognitive Development Tasks

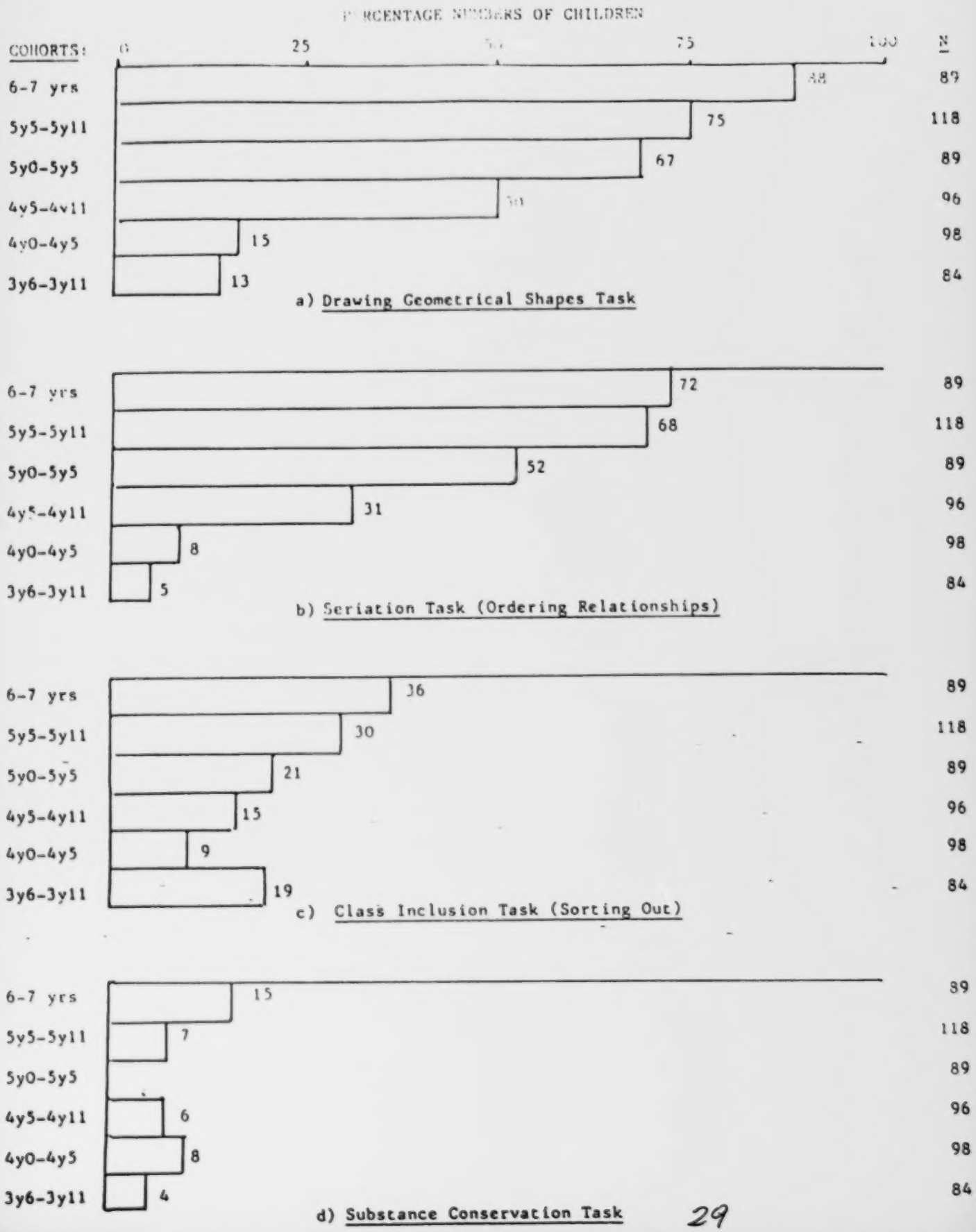
No	Task	AGE COHORTS					
		N=34	N=93	N=95	N=89	N=113	N=89
		Age 3.6 - 3.11	Age 4.0 - 4.5	Age 4.6 - 4.11	Age 5.0 - 5.5	Age 5.6 - 6.0	Age 6 - 7
	Conservation						
1	Area	7	5	8	7	9	10
2	Substance	4	8	6	9	7	15
3	Length	1	3	3	1	5	9
4	Causality	23	21	26	30	35	28
	Geometrical Shapes						
5	Identification	4	4	14	10	23	25
	Drawing	13	15	50	57	75	88
	Time Concepts						
6	1 Age of Persons	51	70	78	87	90	91
7	2 Day/Week etc	2	1	7	8	13	29
8	Class Inclusion	11	9	15	21	30	36
9	Seriation	5	3	31	52	53	72
10	Area Calculation	23	23	44	27	39	51
11	Object Distance	7	20	23	25	39	44

Table 3a Percentage numbers of children attaining positive status on Cognitive Tasks over three test occasions, for two age cohorts together with F values(repeated Meausre) and performance patterns

Tasks	Cohort 3y6 -3y11(n= 35)			
	PATTERN OF PERFORMANCE OVER 3 TEST OCCASIONS 1st 2nd 3rd	PATTERN DESCRIPTION	F VALUE	SIGNIFICANCE LEVEL
Length Conservation	3 0 5	Erratic (Progression)	1.21	
Substance Conservation	6 3 5	Erratic (Progression)	0.21	
Causality - Duck	31 36 44	Progression	0.62	
Causality - Clouds	0 24 17	Erratic (Progression)	4.52	p >.01
Causality - Plants	3 30 12	Erratic (Progression)	4.51	p >.01
Causality - Clock	9 18 12	Erratic (Progression)	0.18	
Geometrical Shapes Identification	6 12 32	Progression	4.01	p >.01
Geometrical Shapes Drawing	9 9 29	Progression	20.25	p >.0001
Time - Age Relation	54 79 90	Progression	7.54	p >.001
Time - Days/Weeks	3 6 5	Erratic (Progression)	2.04	
Class Inclusion	17 27 46	Progression	3.69	
Seriation	6 18 51	Progression	18.27	p >.0001
Object Distance	9 27 27	Progression	3.09	

Cohort5yo - 5y6 (n=50)			
PATTERN OF PERFORMANCE OVER 3 TEST OCCASIONS 1st 2nd 3rd	PATTERN DESCRIPTION	F VALUE	SIGNIFICANCE LEVEL
2 11 5	Erratic (Progression)	3.11	
1 5 8	Progression	2.58	
30 50 49	Erratic Slight (Prog)	3.44	
3 25 23	Erratic Slight (Prog)	3.42	
17 52 13	Regression	11.20	p >.001
9 34 38	Progression	5.20	p >.01
15 38 14	Erratic (Progression)	9.45	p >.001
72 68 56	Regression	3.64	
81 96 85	Erratic Slight (Prog)	3.12	
8 14 13	Erratic Slight (Prog)	3.42	p >.01
23 30 38	Progression	1.30	
57 71 90	Progression	8.99	p >.001
26 68 54	Erratic (Progression)	15.34	p >.0001

FIGURE 2 PERCENTAGE NUMBERS OF CHILDREN SHOWING DIFFERENT LEVELS OF SUCCESS ON SELECTED COGNITIVE TASKS



The base line information obtained from the pre-school sample indicates that abilities such as visual discrimination, recognition, matching, grouping and ordering whether tested through mathematical or linguistic examples, are strong features of this sample of the pre-schoolers' cognitive profile, and that the profile composition is a function of increase in age.

On the other hand, children's ability to solve Piagetian tasks which test the resolution of apparent perceptional disparities as in the number and liquid substance conservational tasks, tasks that demand simple explanation of cause and effect and classifying objects, are clearly weaker features of these children's cognitive profile even for the 6-7 years cohort (See Table 3 and Figure 2). Audio-discrimination of certain letters (eg l,p) and words (eg the, rice, played) and an ability to be verbally fluent are amongst the weaker features of these pre-schoolers' cognitive profile. Although children did better in Verbal fluency in Mandarin, Malay and Tamil the ability to be fluent did not emerge as a strong feature.

It is perhaps no coincidence that in this, the weaker part of the cognitive profile, most tasks require a certain degree of competence in the use of language to convey an understanding of the task and to respond to it positively. Most of the developmental tasks on which the older pre-school child do not perform well are Piagetian. A possible reason for this may be that these particular Piagetian tasks require a language competence not yet attained by the oldest cohort. Another possible reason is the nature of development tasks, which are more involved and complex than those for mathematics and language and are probably more difficult on which to

perform successfully. The evidence from the longitudinal data shown in Tables 1a, 2a and 3a provides further proof of both the strengths and weaknesses of these children's cognitive capacities. Nevertheless, whatever the underlying causes for the patchy nature of these pre-school children's cognitive profile, it is clear that the school curriculum needs to compensate substantially in the area of language fluency for both English and the local languages. Compensation should aim at improving existing curriculum content as well as more imaginative and teaching process. In the case of content, a selection of more culturally relevant teaching and learning materials would be an improvement e.g. stories depicting local customs. For process, more interactive learning and teaching approaches would be desirable. There are several ways in which class interaction can be initiated, for instance through more group focussed language activities. This would enable the children to interact with one another more effectively.

Teachers could also take part in these group activities both as facilitators and as a group member. "Super-peer" - lead group activities where the more able pupils could also act as facilitators, would be another way in which interaction could be organised and improved. Compensation for the poor showing on some of the cognitive developmental tasks could also be part of the language compensation strategies. As inadequate language competency is probably one of the main factors for the poor showing in cognitive tasks, getting children to explain contrived causal and conservational situations which are more typical of their day to day lives rather than the rarefied situations, usually a feature of Piagetian development tasks, might give more positive results. Home

environment should also not be omitted in the above discussion. Parents and older family members have a constructive role to play in the compensation and enhancement of children's cognitive growth. Both home and school are places where children's language and cognitive potential can be realised. Interactive activities initiated at school need to be continued at home. Similarly, activities at home and the child's other non-school environments e.g. playgrounds, churches, should feature prominently in an enlightened and adaptable school curriculum. Encouraging a reciprocity between school, home and other child environments as far as learning experiences are concerned, would provide a qualitative contribution to the child's cognitive profile and its development. It would also very likely enhance both the quality of education and the furtherance of a sound curriculum.

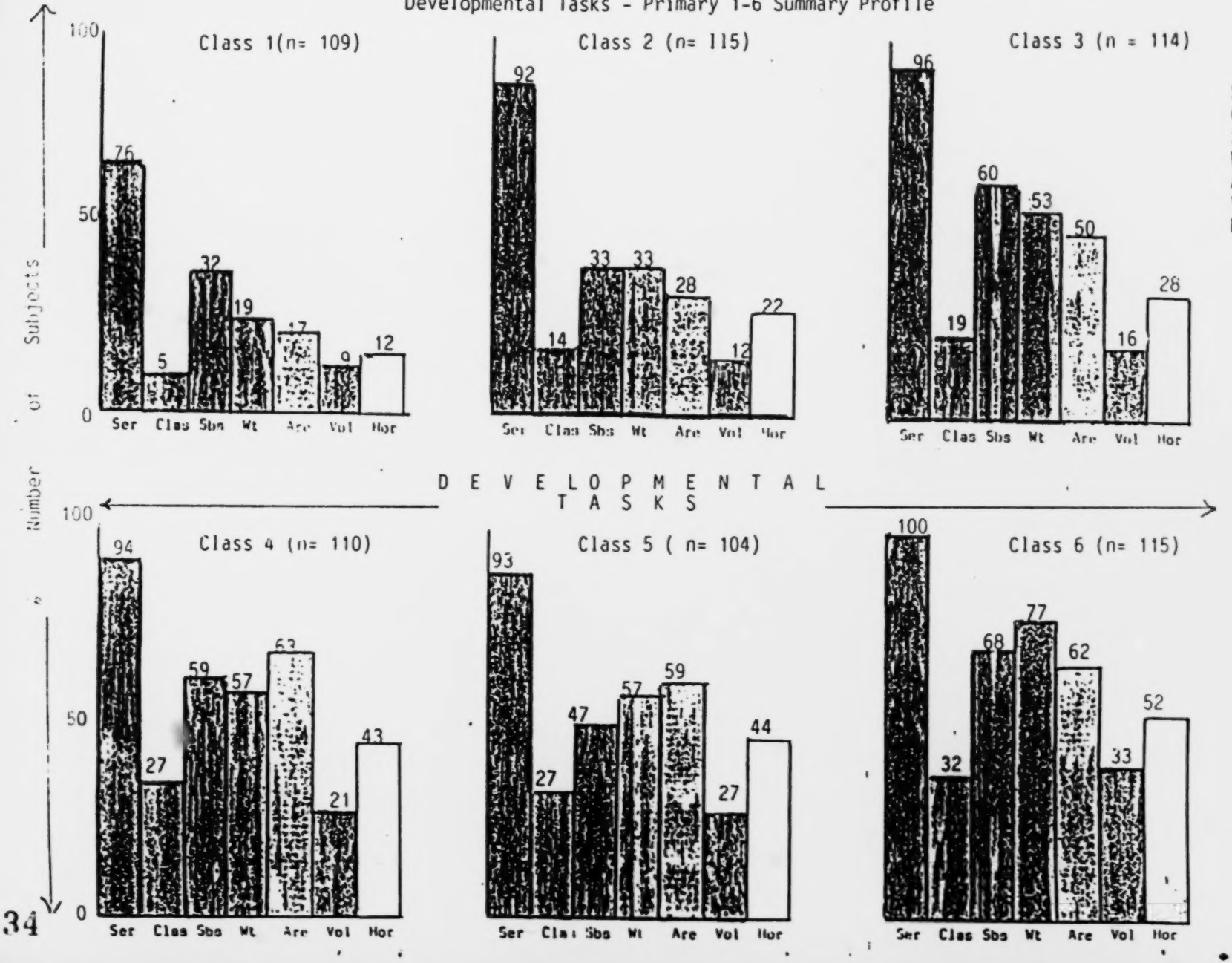
(F) Baseline data on Primary School Children's Cognitive abilities

The second study of Singapore children's cognitive capacities concern Primary School age children, Thomas (1984) (1984a) and which like the first study had as one of its objectives, the acquisition of base line data for a cognitive profile of primary school children. The study, the first of its kind in Singapore was developmental and the Piagetian Paradigm constituted the principal conceptual framework. The design was cross-sectional, covering an age spectrum of 6-15 years. The sample of 667 children attended Government schools and reflected a Singapore Primary school population bridging Primary classes 1 - 6, in which ethnicity was representative of national proportions. The number of boys and girls almost equal. The parental socio-economic background of the sample represented all job

categories but having a preponderance of the middle income groups. Nine tasks were administered to each child using a one-to-one interview and in which the language of communication was the preferred mode of each subject; i.e. English, Mandarin, Malay or Tamil. Competent back translations were again obtained for all the measures. The tasks included seriation, conservation of liquid, weight, area and volume, class inclusion, appreciation of the horizontal, causality and geometrical area. Briefly, the main findings shown in Figure 3 shows that there were clear expected developmental trends for most tasks.

However, the numbers of children able to appreciate all the conversational tasks; logically explain cause and effect situations, and classify objects were low for each age level compared to other research studies. However, where the tasks emphasized strong number concepts as in geometrical area (iteration) or where recognition skills are stressed as part of the appreciation of the horizontal, the numbers of children performing positively in these tasks were more than that recorded by other researchers. The results for causal thinking showed that causal explanation was confined to one word or two or three word phrases for most of the oldest primary grade children; there were incidences of even pre-causal responses for this age group. Similar to the pre-school results discussed earlier where number concepts are emphasized in cognitive development tasks, most children by the time they reach the end of the primary school, perform well on such tasks. Cognitive abilities such as recognition, ordering relationships and matching are unmistakenable features in the cognitive profile of this primary school sample.

Figure 3 -Showing % Distribution of Ss registering + responses on Non Causal Developmental Tasks - Primary 1-6 Summary Profile



Where tasks require verbal fluency and competency in explaining relationships between concepts as in causality problems and most conversational tasks, children did not perform well.

What was found in the previous pre-school study concerning the apparent strength of recognition, counting, ordering and matching abilities and the use of number concepts in solving mathematical operations such as addition and subtraction seem to be developed further in the primary school sample. This suggests that once again curriculum planners are posed with questions concerning curriculum content and processes with children's cognitive profiles. A major question relating to match is that age alone should not be the only basis but that well documented cognitive profiles of individuals or small groups of children should be another source for effective curriculum planning.

As far as language is concerned and its relationship to those cognitive tasks which require a child to explain their understanding of these tasks, the curriculum planner has the same role as in the pre-school curriculum, namely, giving more emphasis to curriculum content and process. This means for content, promoting more cultural relevance; for process, more imaginative teaching and learning strategies which promote interaction rather than monologue between teacher and the whole class. Again, home environment has a crucial role to play in language development and cognitive development. The reciprocity involving home and school experiences needs to be encouraged and emphasised more. Without this reciprocity, educational quality in the form of a relevant and adaptable curriculum is likely to remain an ideal.

(G) Baseline Data on Moral and Social Behaviour

Studies carried out with Singapore pre-school, primary and secondary school children concerning their appreciation of certain moral and social concepts have also contributed to a growing amount of baseline information.

Ko (1985) and Ko and Thomas (1986) showed how six discrete cohorts in a cohort-sequential designed study of Singapore pre-school children performed successfully on sharing and social cooperation with increase in age.

However no clear trends could be traced for moral reasoning tasks on lying, obedience and stealing.

Sub samples of the same children who were tested on three discrete occasions over an 18 month span showed that just over 50% of the sample were successful on the cooperation task, while considerably less than 50% were able to perform on a sharing task. Again for the moral concepts apart from lying, where 20% of 6 - 7 years were able to give some form of autonomous judgement, there were no clear trends.

The baseline information on cooperation and to a lesser extent for sharing showed that children became more aware of cooperating and sharing amongst themselves.

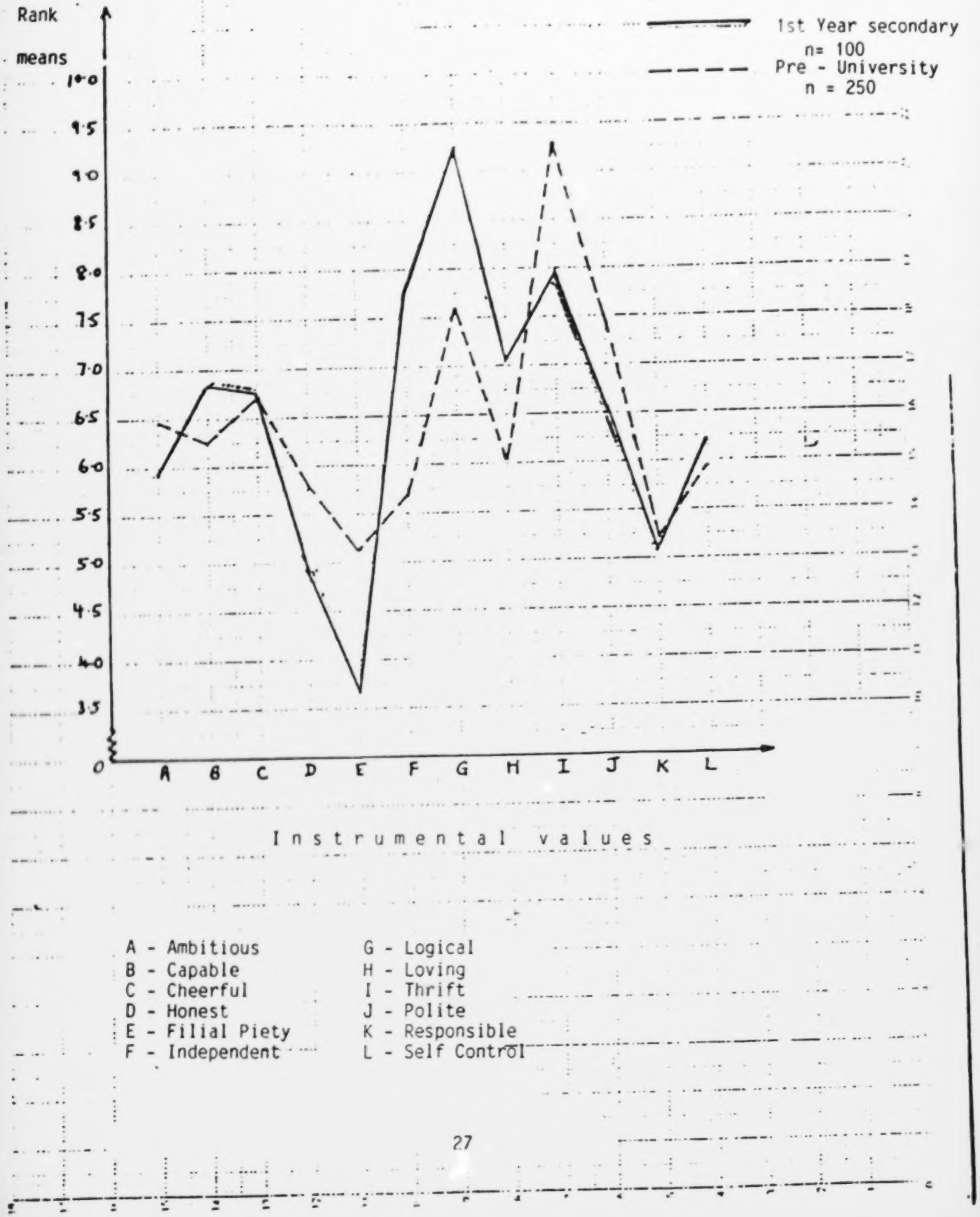
Table 4 Percentage Numbers of Children from 6 Cohorts Showing Their Successful Performance on Five Social Development Tasks

No	Task	AGE COHORTS					
		N=84	N=98	N=96	N=89	N=113	N=89
		Age 3.6 - 3.11	Age 4.0 - 4.5	Age 4.6 - 4.11	Age 5.0 - 5.5	Age 5.6 - 6.0	Age 5 - 7
1	Sharing	5	4	15	9	15	15
2	Moral Reasoning 1 TV Situation	0	4	2	2	12	3
3	2 Sweets	1	0	4	6	1	6
4	3 Lying	6	9	6	9	11	20
5	Cooperation	18	14	34	35	52	57

Table 5 Rank order of Instrumental Values (mean comparisons) 1st year secondary students and Pre-University Students compared.

1st Year secondary (n=100)	Pre - U (n=250)
Filial Piety	Filial Piety
Honest	Responsible
Responsible	Independent
Ambitious	Honest
Self-controlled	Self-controlled
Polite	Loving
Cheerful	Capable
Capable	Ambitious
Loving	Cheerful
Independent	Polite
Thrift	Logical
Logical	Thrift

Figure 4 Rank mean values given by 1st year secondary students and Pre - University Students



However, the baseline information on moral concepts is hazy and does not allow any conclusions to be drawn that could affect curriculum planning for a primary school Moral Education Programme. At the other end of the age spectrum, a study on the Development of values amongst Singapore Adolescents, Thomas(1987) showed that instrumental values such as filial piety, honesty, responsibility, self control were not that differently ranked by the youngest age group and that of the older Pre-University Students (See Table 5 and Figure 4). In a previous study on adolescent value by Balhatchet(1980) filial piety, a value considered to be typical Asian was not included. In the study by Thomas (1987) this value wae included for it was thought it reflected the cultural context of Singapore adolescents. The results showed that by including this specific intra-cultural value, filial piety was ranked highest by the young and older children. This extends the baseline information reflecting the cultural context of the respondent and making the data richer. This reinforces the point made in the thesis of the present paper that baseline data should also include not only the necessary and possibly universalistic values but that culture related value e.g. filial piety should also be included.

With this information, curriculum planners are clearly in a better position to develop a moral education curriculum knowing not only how the more established values like honesty, responsibility are perceived by children but also the culture specific ones like filial piety and thrift are also viewed.

Conclusion

In this paper, an attempt has been made to examine the value of developmental baseline information from an educational point of view. A major role for any educationalist, whose responsibility it is to plan and develop a school curriculum, is to be able to make decisions about linking children's cognitive profile at a particular age and the needs of a curriculum.

The principal value of baseline information on children's development and learning, is that it provides a crucial basis from which this linking process can be realised. It has been shown from the Singapore data, that the amount of baseline data available for curriculum planning is growing. Furthermore, performance on many mathematical tasks show that pre- schoolers achieved with considerable success; even beyond the expectations of the first and second year of the primary school mathematics curriculum. On the other hand, language performance especially in the area of verbal fluency and pronunciation falls short of what is expected of the early years of the primary school, as indeed do children's performance on the cognitive developmental tasks. The indications from these different sets of baseline data: one showing expectations being more than fulfilled, the other showing that the trends fall short of expectations, provide signals for adjustment to the content of the existing curriculum of the primary school.

As far as the baseline information on social and moral behaviour is concerned, it has been shown that by devising new tasks on social cooperation and including culturally relevant values e.g. filial piety, in the acquisition of baseline data, meeting the needs of a

Moral Education Programme may be easier to accomplished.

On all counts, the acquisition of baseline data on cognitive, social and moral development of Singapore schoolchildren, has meant that a sound basis is being developed for the school curriculum. The outcome of this may be for Singapore at least, that the goal of improved educational quality may be within reach.

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